

Original Research Article

A study of disability in patients with chronic musculoskeletal pain

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ABSTRACT

Background: Musculoskeletal impairment is the most common cause of chronic pain and subsequent disability world over. Yet their very few Indian studies on this subject. The aim of study was to assess the extent of disability in out-patients suffering from chronic musculoskeletal pain, to determine whether the disability varied with the age and sex of the patient, to assess any correlation between the intensity of pain and the extent of disability, and to evaluate whether the extent of disability depended upon the site, periodicity and duration of pain.

Methods: The 200 patients of chronic musculoskeletal pain were assessed for disability using the pain disability questionnaire (PDQ) and pain intensity using the numeric pain rating scale. The patients with mild, moderate and severe disability were compared using non parametric tests to assess the differences related to age, sex, pain intensity, site, duration and periodicity of pain.

Results: The 56% patients had mild, 41% had moderate while 3% patients reported severe disability. Disability was higher in patients in the younger age group, higher intensity of pain, heel pain and variable pain. In the regression analysis, pain intensity emerged as the sole predictor of disability.

Conclusions: We conclude that 56% patients had mild, 41% had moderate while 3% patients reported severe disability. Disability was higher in patients at the extremes of age, higher intensity of pain, and variable pain. Gender and pain duration did not have any significant association with disability.

Keywords: Chronic musculoskeletal pain, Disability, Pain intensity

INTRODUCTION

Musculoskeletal (MSK) disorders are inflammatory and degenerative conditions affecting the muscles, tendons, joints, peripheral nerves and supporting blood vessels.¹ MSK impairment is the most common chronic impairment world over, as nearly 25% of the adult subjects suffer from chronic MSK pain.² Yet, these conditions are not regarded as national health priorities both by the medical community as well as the policy makers perhaps because they are not life threatening. Hence, they have not received the attention that they deserve.³ It was for this reason that COPCORD (Community-Oriented Programme for control of rheumatic diseases) was launched by the WHO (World health organisation) and ILAR (International league of

associations for rheumatology) in 1981 with an aim to collect data on pain and disability due to MSK disorders in developing countries.³ Under this initiative, the population surveys completed so far, have revealed an extensive burden of pain and disability in the community.³ These patients are commonly seen in orthopaedic out-patient practice. Meaningful assessment of their chronic pain poses a huge challenge. It is a more demanding and complex task than assessing acute pain because chronic pain ceases to serve a protective function, and instead degrades health and functional capacity.⁴ It has a major impact on physical, emotional and cognitive function, on social and family life and on the ability to work and secure an income.⁵ It is recommended that the assessment of chronic pain should include assessment of pain severity,

physical and emotional functioning, patient's perception of improvement, side effects and other symptoms and demographics.^{6,7} For everyday clinical practice however, it is necessary to assess outcome measures, that are practical enough to be easily used in all patients and yet comprehensive enough to add value to the evaluation. Disability caused due to chronic pain is one such comprehensive measure. Yet there are very few Indian studies on this subject. There have been studies that have assessed the prevalence of MSK disorders but systematic studies on the severity of chronic pain and subsequent disability are lacking.⁸ The guiding research questions throughout this study were, did the patients with chronic MSK pain experience disability? If they did, what was its severity? Was the disability related to contextual variables like the socio-demographic profile of the patient or primary factors like the intensity of pain or secondary factors like the site of pain, its periodicity and duration? Hence, we decided to conduct this study with the following aims and objectives were to study the extent of disability in out-patients suffering from chronic musculoskeletal pain. To determine whether the disability varied with the age and sex of the patient. To assess any correlation between the intensity of pain and the extent of disability. To evaluate whether the extent of disability depended upon the site, periodicity and duration of pain.

METHODS

This was a prospective, cross-sectional study. Ethics committee approval, and informed consent approval was taken. This study was conducted at D.Y. Patil medical college, a tertiary care teaching hospital in Navi Mumbai. The study was conducted from 26 July 2020 to 25 July 2021, for a period of 1 year. The 200 patients were selected for this study by taking an avg. of the no. of patients reporting to this tertiary centre in a period on 3 years. The records were taken from the medical records department. The inclusion criteria were, Patients suffering from pain of duration >3 months at any of the following sites: neck, back, knee, heel, shoulder. The pain was identified to be of musculoskeletal origin. Patient willing to give informed consent. The exclusion criteria were, to assess chronic pain due to musculoskeletal conditions only, patients with a malignancy, severe osteoporosis or neuropathic pain were excluded. Patients having pains at multiple sites and/or visceral pain and headache. Patients less than 18 years of age.

The socio-demographic and illness related variables were collected using a specially designed semi-structured proforma. The extent of disability was ascertained using the pain disability questionnaire (PDQ).⁹ It measures disability due to pain for chronic MSK disorders. It yields a total functional disability score ranging from 0 to 150. The levels of disability are mild=1-40, moderate=41-70, severe=71-100, very severe=101-130, extreme=131-150. Two subscales are the Functional Status Component and Psychosocial Component. Rest-retest reliability coefficient range from 0.94 to 0.98 and a Cronbach's alpha

coefficient is 0.96. The intensity of the pain was assessed using the numeric pain rating scale.¹⁰ It is a numeric version of the visual analogue scale to measure pain intensity in adults. The 11-point numeric scale ranges from '0' representing one pain extreme (e.g., no pain) to 10 representing the other pain extreme (e.g., or "worst pain imaginable") and the patients select a whole number that best reflects the intensity of their pain. Chronic pain patients report the average pain intensity. Cut off scores for mild, moderate and severe pain are provided. It is fast and easy to administer and score. It overcomes the language barrier. The test-retest reliability ranges from 0.95-0.96 and the construct validity ranges from 0.86 to 0.95. Intermittent pain was described as the pain which "comes and goes" and the patients have moments when they are completely free of pain. Patients who had pain that was constant and did not change were described as having stable pain. Patients who were never pain free, but their pain types and pain severity varied from one moment to the next were described as having variable pain.¹¹

Statistical analysis

For the evaluation of the findings of the study, IBM SPSS Statistics data editor 20 software was used. The socio-demographic and pain related variables have first been described with descriptive statistical methods like frequency, percentage, mean and standard deviation. Assumption of normal distribution and homogeneity of variance was checked for the continuous scale variable of disability by using the Shapiro-Wilk test and the data was not found to be normally distributed. Hence non-parametric tests were used in this study. Spearman's Correlation Coefficient test was used for correlations, Mann-Whitney U test for comparison of means between dichotomous variables, Kruskal-Wallis Test for comparison of means between more than two groups with post hoc tests. Finally, since the assumptions were met, selected variables were entered into a regression model and significant predictors were determined. A $p < 0.05$ was taken as significant.

RESULTS

Socio-demographic data

A total of 200 patients were studied of which 98 were males and 102 were females. The mean age of the sample was 45.45 years \pm SD=12.7 years. The median age was 45 years. The socio-demographic data of the patients is as shown in Table 1.

Pain related variables

The 83 (41.5%) patients complained of pain in the back, 54 (27%) in the knee, 40 (20%) in the neck, 14 (7%) in the shoulder and 9 (4.5%) in the heel. Majority patients had pain less than six months i.e., 3-6 months $n=108$ (54%), 6-12 months $n=63$ (31.5%), 1-2 years $n=26$ (13%) and >5 years $n=3$ (1.5%). As regards to the periodicity of the pain,

114 (57%) patients reported intermittent pain, 51 (25.5%) variable pain while 35 (17.5%) had stable pain. The intensity of pain ranged from 1 to 8 with the mean score for the whole sample being $4.20 \pm SD=1.4$ which ranges in the moderate intensity of pain. The median pain score was 4.0. 59 patients (29.5%) experienced mild pain, 119 patients (59.5%) experienced moderate pain while 12 patients (6%) experienced severe pain. The mean score of pain severity at different sites was as shown in Figure 1.

Table 1: Socio-demographic data of the study population.

Domain	No. of patients (%)
Age group (years)	
18-30	24 (12)
30-50	109 (54.5)
50-70	59 (29.5)
>70	8 (4)
Occupation	
Working	100 (50)
Retired	26 (13)
Homemakers/ at home	74 (37)
Nature of work	
Active	134 (67)
Sedentary	66 (33)

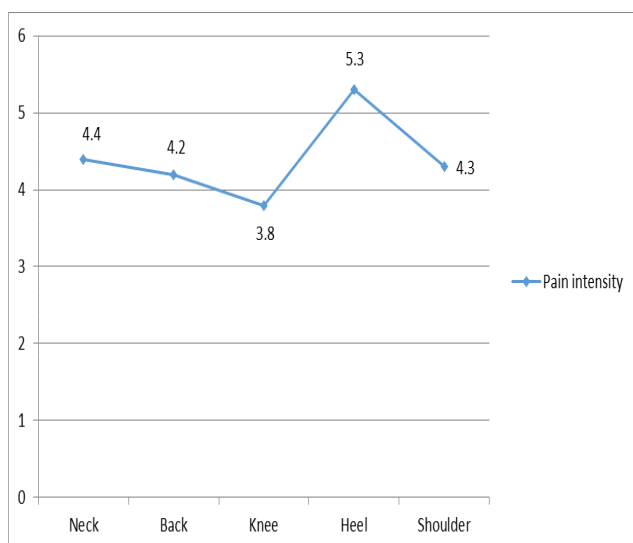


Figure 1: The mean score of pain severity at different sites.

Disability

The scores on the PDQ ranged from 10 to 104 with a mean total score being $37.30 \pm SD=19.5$. The median score was 29.0. The mean scores on the Functional Status Component was $22.94 \pm SD=12.3$ and the median was 20. The mean score on the psychosocial component was $14.36 \pm SD=8.7$ and the median was 10. Mild disability was seen in 56% of the patients, 41% had moderate while 3% had severe disability.

Clinical correlates of disability

There was a negative correlation between age and disability, but this was not statistically significant. (Spearman’s rho=-0.073; $p>0.05$) A graph was plotted using the mean scores of the disability in each age group and it has been depicted in Figure 2. Therefore, disability was higher in the younger age group of 18-30 years and the oldest group of >70 years as compared to the two age groups in between. Thus, disability was higher in the extremes of age. The statistical significance was tested using the Kruskal Wallis test as shown in Table 2 and it was found that the different age groups differed, in their extent of disability. However, when post-hoc tests were applied, it was found that only the younger age group i.e., 18-30 years had higher disability as compared to the middle age groups i.e., 30-50 years and 50-70 years. The other groups did not differ significantly.

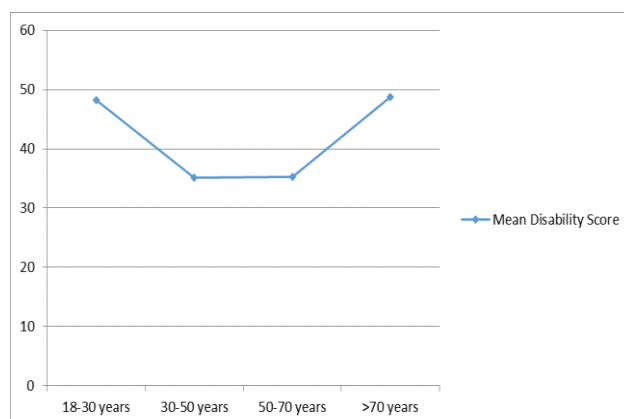


Figure 2: Mean score of disability in different age groups.

Table 2: Kruskal-Wallis test for comparing mean disability in different age groups.

Test statistics ^{a,b}	Disability
Chi-square	10.265
Df	3
Asymp. Sig.	0.016

a. Kruskal Wallis test, b. Grouping variable: Age group.

The mean score for total disability was 37.13 for males and 37.46 for females. No statistically significant difference was observed between the means on the Mann-Whitney U test as seen in Table 3.

Table 3: Mann-Whitney U test for comparing mean disability in the two genders.

Test statistics ^a	Disability
Mann-Whitney U	4801.000
Wilcoxon W	9652.000
Z	-0.482
Asymp. sig. (2-tailed)	0.630

a. Grouping Variable: Sex.

Table 4: Spearman’s correlation coefficient test between pain intensity and disability.

Correlations		Disability	Pain severity
Spearman's rho	Disability	Correlation coefficient	1.000
		Sig. (2-tailed)	.
		N	200
	Pain severity	Correlation coefficient	0.422**
		Sig. (2-tailed)	0.000
		N	200

** . Correlation is significant at the 0.01 level (2-tailed).

As both pain and disability were both measured in numeric values, where an increase in the score meant an increase in pain and disability, the two parameters were compared using a Spearman’s coefficient correlation test as seen in Table 4. There was a significant positive correlation. Thus, as the severity of pain increased, disability also increased.

The mean scores of disabilities at different sites were as shown in Figure 3. These means were compared using the Kruskal-Wallis test and the difference was found to be significant (Table 5). In, order to further throw light on this difference, a series of post-hoc Mann-Whitney U tests were used and it was found that heel pain posed a higher disability than knee pain [Asymp. Sig (2-tailed)=0.026] and shoulder pain. [Asymp. Sig (2-tailed)=0.017] differences between other sites not significant.

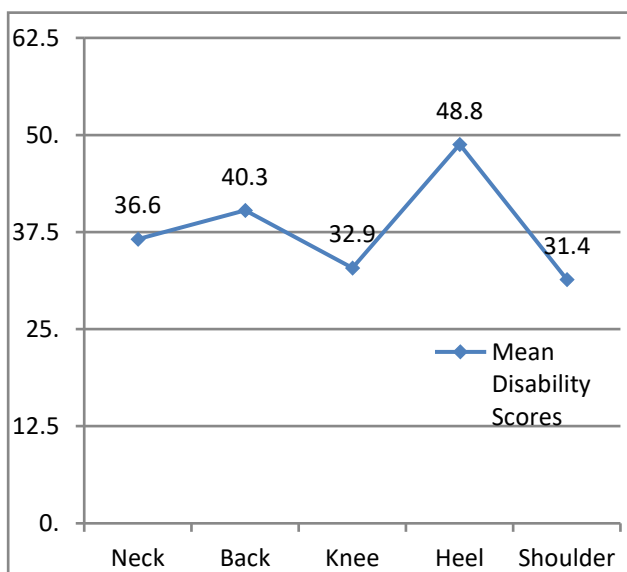


Figure 3: Mean score of disability in different sites of pain.

Table 5: Kruskal-Wallis test for comparing mean disability at different sites of pain.

Test statistics ^{a,b}	Disability
Chi-square	9.548
Df	4
Asymp. sig.	0.049

a. Kruskal Wallis test, b. Grouping variable: site of pain.

The mean scores of disabilities were 33.95±17.65 for intermittent pain, 47.98±19.45 for variable pain and 32.2±20.46 for stable pain. Comparison of these means and post hoc tests confirmed that patients with variable pain had higher disability than those with intermittent or stable pain (Table 6).

Table 6: Kruskal-Wallis test for comparing mean disability in different periodicity of pain.

Test statistics ^{a,b}	Disability
Chi-square	20.677
Df	2
Asymp. sig.	0.000

a. Kruskal Wallis test, b. Grouping variable: periodicity.

Disability did not differ significantly in the patients with different durations of pain as seen from Table 7.

Table 7: Kruskal-Wallis test for comparing mean disability for different duration of pain.

Test statistics ^{a,b}	Disability
Chi-square	3.968
Df	3
Asymp. sig.	0.265

a. Kruskal Wallis test, b. Grouping variable: duration

Thus, age, pain intensity, pain site and periodicity were the variables that were found to have a significant association with disability. Hence, a multiple regression model to predict disability from these parameters. The adjusted R square value of 0.151 indicates that the independent variables explain 15.1% of the variability in disability. The F-ratio in the ANOVA, F (4, 195)=9.819, p<0.005 indicating that the regression model is a good fit for the data. Only pain intensity statistically significantly predicted disability, p<0.05.

Similar tests were repeated individually for both the subscales of disability. The findings were similar to the findings for the total scale.

DISCUSSION

At the outset, it is important to note that it is difficult to compare the various studies of musculoskeletal (MSK) pain because of marked heterogeneity in the study

populations, methods of data collection and analysis as well as the outcome measures taken into consideration.

In our study, the mean total score on the pain disability questionnaire was $37.30 \pm SD=19.5$. 56% of the patients had mild, 43% had moderate while 3% patients had severe disability. The term disability is explained as all impairments, activity limitations and participation restrictions.¹² This observation needs to be interpreted with caution due to the nature of the cut off scores. However, none of the patients scored zero on the scale and only five patients had scores below 15.

A relatively recent WHO-ILAR-COPCORD-BJD study reported that 31% patients scored a significant health assessment questionnaire disability index.³ An earlier rural survey under the same initiative had reported mild, moderate and severe grades of functional disability, in 74%, 15% and 6% of the MSK pain subjects, respectively.¹³ Another comprehensive survey conducted by the Indian Council of Medical Research in 2012 found that on an average in the three centres, only 21% patients reported no functional limitation while the remaining had varying degrees of limitation, 41% reported impairment in activities of daily living.¹⁴ An international study on chronic pain reported that 37.9% people reported a moderate influence and 31.5%, a severe disturbance of daily activities due to pain.¹⁵

While the prevalence of disability or functional limitation may vary, we must keep in mind, that given the extensive prevalence of MSK pain in the population, the actual numbers of patients suffering from disability will be very large and requires urgent attention.

In our study, disability was higher at the extremes of age. In a systematic review of prognostic factors for musculoskeletal pain Mallen et al have identified, older age as a risk factor for poor outcome with chronic pain.¹⁶ While this may seem obvious to the reader on account of the high prevalence of comorbidities and cognitive impairment in the elderly, we would like to draw attention to the fact that it was the segment of younger adults that also appears to be a high-risk group for disability.¹⁷ Studies have estimated the prevalence of chronic pain in young adults as lower than in older age groups, at between 4 and 14%. A study on disabling chronic pain in young adults by Mallen et al found that 25.2% patients reported a high disability moderate intensity pain and the prevalence of disabling chronic pain in the sample was 3.0%.¹⁸ Authors have postulated that although a small minority of younger adults are affected, they are likely to represent a group with particularly high health care needs. This concurs with our findings. For such patients, the presence of chronic pain at time of embarking on higher education or employment may greatly alter will affect their future personal and career goals and thus cause significant disruption.

As regards to the role of gender in disability, the past literature is conflicting. There are studies which report that

females have higher disability while others report that gender did not influence disability, which is in keeping with our findings.^{14,15,19,20}

Our study found that the extent of disability increased with the increase in pain intensity. This is in keeping with several studies in which pain intensity has been consistently found to be one of the strongest predictors of disability.^{15,16,19,21}

In our study, heel pain presented with highest disability followed by back pain, neck pain, knee pain and shoulder pain, in that order. There are a few studies that have evaluated the impact of site of pain on disability. In their study on chronic pain, Ven der Windt et al have reported that pain impacted on activities of daily living maximally in ankle and foot problems (42.3%) followed by knee, hand, shoulder and back pain.²² Picavet and Schouten have reported that the highest prevalence for sick leave was for back problems followed by ankle, neck and shoulder problems.²³ An Indian study reported that among the pain sites, hand, shoulder, ankle and low back scored above the rest.³ Thus while the socio-cultural and occupational differences in the population may account for the differences, ankle and back problems appear to be more disabling than pain at other sites. Most studies on chronic MSK pain are site specific and it may seem unusual to compare pain at unrelated sites. However, a review on the subject has postulated that in broad terms, different regional pain syndromes share similar underlying pain attributes and clinical courses and yet may have different outcomes.¹⁶

In our study, variable pain caused significantly more disability than stable or intermittent pain. Further research is needed to throw more light on this subject. One possible reason could be that patients with intermittent pain do experience relief in terms of pain free periods, while those with stable pain are able to plan their lives according to the background pain that they consistently experience. Patients with variable pain on the other hand never have any pain free periods and the unpredictable exacerbation of their pain could be a source of uncertainty and activity limitation.

In our study, increased duration of pain was not associated with an increase in disability. Past research has concurred as well as differed from our findings.^{16,20}

Finally, in our study, none of the parameters studied showed any independent or exclusive association with the psychosocial domain of the disability scale. The associations wherever noted were with both the functional status as well as psychosocial domains. This is not in keeping with theories which suggest that in the setting of disabling pain, psychosocial factors are better predictors of disability than are physical or pathophysiological factors.²⁴ Instead we would like to emphasise that the two factors may work hand in hand. A multidisciplinary team could help to avoid both, unnecessary diagnostic tests and

invasive treatments as well as unwarranted labelling of patients with a psychiatric diagnosis, thereby optimising outcome.

Limitations

The specific diagnosis affecting each patient was not considered. Previous COPCORD research has highlighted the fact that it is the unclassifiable symptoms that occur in a big way and cause disability. The authors recommend that not every MSK pain should be classified into a strict diagnosis.

The other factors that have been known to impact disability such as education, occupation, compliance and obesity have not been evaluated in the present study. Also detail evaluation of anxiety and depression were beyond the scope of this study. This study has the limitations inherent to cross sectional studies.

CONCLUSIONS

We conclude that 56% patients had mild, 41% had moderate while 3% patients reported severe disability. Disability was higher in patients at the extremes of age, higher intensity of pain, and variable pain. Gender and pain duration did not have any significant association with disability.

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